PELLISSIPPI STATE COMMUNITY COLLEGE
MASTER SYLLABUS

COMPUTER ORGANIZATION
CSIT 1600

Class Hours: 3.0  Credit Hours: 4.0
Laboratory Hours: 3.0  Revised: Spring 2010

Catalog Course Description:
Number systems, Boolean algebra, combinational and sequential circuits, processor functional units
and control, pipelining, memory and caching, stored program computing, memory management,
computer system organization, assembly language programming.

Entry Level Standards:
The student must have math, writing, verbal, and English language skills at the college level.

Prerequisite:
CSIT 1020 or department approval

Textbook(s) and Other Course Materials:
The Essentials of Computer Organization and Architecture, Linda Null and Julia Lobur, Jones and
Bartlett, second edition.

I. Week/Unit/Topic Basis:

<table>
<thead>
<tr>
<th>Week</th>
<th>Topic</th>
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<tbody>
<tr>
<td>1</td>
<td>Chapter 1 – Introduction.</td>
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<tr>
<td>2</td>
<td>Chapter 2 – Data Representation</td>
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<tr>
<td>3</td>
<td>Chapter 3 – Boolean Algebra and Digital Logic</td>
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<tr>
<td>4</td>
<td>Chapter 3</td>
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<tr>
<td>5</td>
<td>Test 1: Chapters 1, 2, and 3, Chapter 4 – A Simple Computer</td>
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<tr>
<td>6</td>
<td>Chapter 4, Chapter 5 – Instruction Set Architecture</td>
</tr>
<tr>
<td>7</td>
<td>Chapter 5, 80x86 Assembly</td>
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<tr>
<td>8</td>
<td>80x86 Assembly</td>
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<tr>
<td>9</td>
<td>Test 2 – Chapters 4,5 and 80x86 Assembly, Chapter 6 - Memory</td>
</tr>
<tr>
<td>10</td>
<td>Chapter 6</td>
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<tr>
<td>11</td>
<td>Chapter 7 – I/O (up to Floppy Disks, 7.6.2)</td>
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</tbody>
</table>
II. Course Objectives*:

A. Demonstrate familiarity with the hardware components of a digital computer.
   I,III,IV,VI,IX,XI

B. Demonstrate knowledge of principles and underlying concepts of Boolean algebra, logic
   gates, and functional units such as registers, CPU, ALU, and memory. I,II,III,IV,VI,IX,XI

C. Demonstrate the ability to logically manipulate computer's hardware through assembly
   language programming. I,II,III,IV,V,VI,XI

*Roman numerals after course objectives reference goals of the CSIT program.

III. Instructional Processes*

Students will:

1. Calculate unsigned, signed and floating-point binary number values. Mathematics Outcome,
   Technological Literacy Outcome

2. Design, implement, and test the hardware for a system using a digital circuit simulator.
   Communication Outcome, Technological Literacy Outcome, Mathematics Outcome,
   Transitional Strategy, Active Learning Strategy

3. Design, implement, and test assembly language programs. Communication Outcome,
   Technological Literacy Outcome, Transitional Strategy, active Learning Strategy

4. Describe and use basic ISA-level concepts such as registers and stacks, memory addressing
   modes and ISA-level instruction types and formats. Communication Outcome,
   Technological Literacy Outcome, Transitional Strategy, Active Learning Strategy

5. Detect/correct errors using error detection/correction codes. Mathematics Outcome,
   Technological Literacy Outcome, Transitional Strategy, Active Learning Strategy

6. Explain the fetch-decode-execute cycle. Communication Outcome, Technological Literacy
   Outcome

7. Describe pipelining, parallel processing and calculate speedup. Communication Outcome,
   Mathematics Outcome, Technological Literacy Outcome

8. Calculate cache miss and hit rates, map main memory addresses to cache blocks.
   Mathematics Outcome, Technological Literacy Outcome

9. Describe the difference between physical and virtual memory addresses and calculate
   physical addresses. Communications Outcome, Mathematics Outcome, Technological
   Literacy Outcome

10. Describe disk sectors, error correction codes and calculate disk latency. Communication
Outcome, Technological Literacy Outcome

13. Describe basic issues of process management. Communication Outcome, Technological Literacy Outcome, Technological Outcome

14. Describe the compilation, assembly and linking processes. Communication Outcome, Technological Literacy Outcome

15. Explain the difference between RISC and CISC and calculate execution time. Communication Outcome, Mathematics Outcome, Technological Literacy Outcome

16. Describe different parallel processing techniques. Communication Outcome, Technological Literacy Outcome

17. Use professionally accepted methods and materials in their approach to completion of applications. Technological Literacy Outcome, Transitional Strategy, Active Learning Strategy

18. Practice elements of the work ethic such as punctuality, professionalism dependability, cooperation, and contribution. Communication Outcome, Transitional Strategy, Active Learning Strategy

*Strategies and outcomes listed after instructional processes reference TBR’s goals for strengthening general education knowledge and skills, connecting coursework to experiences beyond the classroom, and encouraging students to take active and responsible roles in the educational process.

IV. Expectations for Student Performance*

Upon successful completion of this course, the student should be able to:

1. Convert numerical data between internal (binary) and external forms. A, B
2. Design, implement and test simple to moderately complex digital systems. A, C
3. Design, implement and test simple to moderately complex assembler programs. B, C
4. Describe and use basic ISA-level concepts such as registers and stacks, memory addressing modes and ISA-level instruction types and formats. C
5. Detect/correct errors using error detection/correction codes. C
6. Explain the fetch-decode-execute cycle. C
7. Describe the difference between physical and virtual memory addresses and calculate physical addresses. C
8. Calculate cache miss and hit rates, map main memory addresses to cache blocks. C
9. Describe the difference between physical and virtual memory addresses and calculate physical addresses. C
10. Describe direct memory access, the difference between polling and the difference between character and block I/O. C
11. Describe disk sectors, error correction codes and calculate disk latency. C
12. Explain cache replacement and write policies. C
13. Describe basic issues of process management. C
14. Describe the compilation, assembly and linking processes. C
15. Explain the difference between RISC and CISC and calculate execution time. C
16. Describe different parallel processing techniques. C

*Letters after performance expectations reference the course objectives listed above.

V. Evaluation:

A. Testing Procedures:

At least 3 exams will be given. Exams may only be made up for excused absences. An excused absence is one that can be verified by supporting documentation. Failure to make a passing test average will result in a grade of F for the course.

B. Laboratory Expectations:

At least 4 digital and 4 assembly language labs will be given. Failure to make a passing lab average will result in a grade of F for the course.

C. Field Work:

N/A

D. Other Evaluation Methods:

Quizzes and homework as indicated by the instructor in a supplement to the syllabus.

E. Grading Scale:

<table>
<thead>
<tr>
<th>Grade</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>A</td>
<td>93 - 100</td>
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<tr>
<td>B+</td>
<td>88 - 92</td>
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<tr>
<td>B</td>
<td>83 - 87</td>
</tr>
<tr>
<td>C+</td>
<td>78 - 82</td>
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<tr>
<td>C</td>
<td>73 - 77</td>
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<tr>
<td>D</td>
<td>65 - 72</td>
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<tr>
<td>F</td>
<td>Below 65</td>
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VI. Policies:

A. Attendance Policy:

Pellissippi State expects students to attend all scheduled instructional activities. As a minimum, students in all courses (excluding distance learning courses) must be present for at least 75 percent of their scheduled class and laboratory meetings in order to receive credit for the course. Individual departments/programs/disciplines, with the approval of the vice president of Learning, may have requirements that are more stringent. In very specific circumstances, an appeal of the policy may be addressed to the head of the department in which the course was taken. If further action is warranted, the appeal may be addressed to the vice president of Learning. (Pellissippi State Online Catalog)

B. Academic Dishonesty:
Plagiarism, cheating, and other forms of academic dishonesty are prohibited. Students guilty of academic misconduct, either directly or indirectly through participation or assistance, are immediately responsible to the instructor of the class. In addition to other possible disciplinary sanctions which may be imposed through the regular Pellissippi State procedures as a result of academic misconduct, the instructor has the authority to assign an F or a zero for the exercise or examination or to assign an F in the course. (Pellissippi State Online Catalog)

C. Accommodations for disabilities:

Students who need accommodations because of a disability, have emergency medical information to share, or need special arrangements in case the building must be evacuated should inform the instructor immediately, privately after class or in her or his office. Students must present a current accommodation plan from a staff member in Services for Students with Disabilities (SSWD) in order to receive accommodations in this course. Services for Students with Disabilities may be contacted by going to Goins 134 or 126 or by phone: 694-6751 (Voice/TTY) or 539-7153. More information is available at www.pstcc.edu/departments/swd/.

D. Other Policies:

Computer Usage Guidelines:
College-owned or –operated computing resources are provided for use by students of Pellissippi State. All students are responsible for the usage of Pellissippi State's computing resources in an effective, efficient, ethical and lawful manner. (Pellissippi State Online Catalog)

In the event that you have an emergency beyond your control, you must notify the instructor as soon as possible.